Grid Computing Environments Community Practice (CP) Document

<table>
<thead>
<tr>
<th>Project Title: JiPANG - A Jini based Computing Portal System -</th>
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<tr>
<td>Project URL(s): <a href="http://ninf.is.titech.ac.jp/jipang/">http://ninf.is.titech.ac.jp/jipang/</a></td>
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INSTRUCTIONS:
1. Prepare document using Times Roman, 10 point font.
2. Submit document in MS Word or PDF format.
3. Complete each of the indicated sections (so that all docs are uniform). Each section has a sub-section entitled "Other" where you can insert information that our CP template did not cover.

1. Overview - including:
   A) Description & Goals

   JiPANG (Jini-based Portal AugmeNting Grids) is a computing portal system that provides uniform access layer to a large variety of Grid services including other PSEs, libraries, and applications. The system is built on top of the Jini technology, and each of the Grid services will be incorporated as Jini services and be made usable through the portal. The key feature of introducing Jini is that it allows the portal users or other Jini services to utilize the latest version of the client software to interact with the service providers without the need to install nor update it. This reduces the cost of installation and redundant development. The Jini service could be developed for a specialized purpose such as resource scheduling, computation, or visualization. JiPANG enables the development of other specialized science portals with the combination of these Jini services. This will realize more dynamic and flexible component programming for Grid computing.

   In the first release of the system, the Jini service registered with the portal is managed by the Jini lookup service directly. However, in the next release, we will introduce a LDAP server to manage the information of all the Jini services, being managed by the individual Jini lookup service, in order to overcome scalability issue of the Jini lookup service and its poor pattern-matching mechanism for the service.

   Currently we have developed various Jini services for Grid systems as well as a common interface for accessing client-server Grid computing systems such Ninf and NetSolve in a uniform way.

   B) Services provided

   1. Service Provider Toolkit:

      The JiPANG project provides the service provider with a core set of Java API what we call Service Provider Toolkit. The API encapsulates many features provided by Jini such as resource discovery, leasing, and event notification, etc, and facilitates the development of their Jini service and its registration with the portal. With the API, it is straightforward to make the existing Grid services visible and usable over the network.

   2. Client Toolkit:

      A set of Java API provided for the portal users. The API has capabilities for automatically accessing the appropriate Grid services registered with the portal, without requiring the knowledge of Jini and without the need to install any client software beforehand. Also the API defines a common interface for accessing the Grid RPC system such as Ninf and NetSolve.

   3. JiPANG Browser

      A GUI application which publishes the information of all the services registered with the portal such as the Java interface it supports, the location of the Jini lookup service which the service is registered
with, the attributes associated with the service, and the unique ID that all active services are given. Using one or more pieces of this information, the client can locate the service through the specified Jini Lookup service. The service with GUI could be used directly through the browser. This application also helps the users to search for the desired service.

C) Systems/Sites/User Served

1. Indiana IU Active Notebook
2. Ninf/NetSolve users
3. Globus users thru the COG Toolkit (Planned)

D) Status

Alpha test.
Currently the following services have been integrated with the JiPANG system.
1. System
   Ninf / NetSolve / A remote execution of JLAPACK via Java RMI
2. Toolkit
   CoG, NWS (v1.1)
3. Scientific Computing Library
   JLAPACK
4. Application
   GSIFTP GUI (Indiana IU)
5. An extensive list will be available at http://ninf.is.titech.ac.jp/jipang/services/
A new release is planned in April 2001 incorporating the enhanced JiPANG Toolkit and other supported Grid services such as other Java-based PSEs, visualization services, Neos, Bricks, Javalin and more.

E) Other

2. Architecture

A. Define Grid software/services that the GCE currently depends upon and relationship to GF Working Group.

The portal will depend upon all of the Grid services that have Java interfaces to interact with them. Please refer to currently supported Grid services in the above list.

B. Define Grid software/services that the GCE plans to make use of

More advanced Information Services

C. Define Grid software/services that are needed by the GCE but are not supported by the Grid

A Java/Jini interface to all kinds of Grid services

D. Define software/services used/needed by the GCE that are outside the scope the Grid

A standardized interface for problem description such as standard problem names and calling sequences

E. Other

3. Implementation

A. Commodity technologies/software used

Java, Jini, XML, JNDI, LDAP, Python, Jython

B. Proprietary technologies/software developed that can be shared with others

All of the Jini services registered with the portal have the potential of being shared by other Grid services. Some Grid applications could use the NWS service for the network prediction phase, the
Grid RPC services such as Ninf and NetSolve for the computational phase, and a visualization service for visualizing the given result.

C. Other

4. Supported Grid Services

A. Security
uses the Jini mechanism based on Java 2

B. Information services
uses Jini Lookup Services and LDAP services.

C. Scheduling
can be performed by the scheduling unit of the selected individual Grid system. It is also possible to assign the scheduling phase to the other scheduling service registered with the portal such as Globus and Nimrod/G.

D. Data transfer
can be performed by the data transfer unit of the selected individual Grid system. It is also possible to assign the phase to the other data transfer service registered with the portal such as GSIFTP.

E. Additional Grid services
It is straightforward to add new Grid services to the portal with the Service Provider Toolkit.

G. Other

5. Project Status and Future Plans
Beta release is scheduled for April of 2001. Future plan includes the enhancement of the resource management and security, and the introduction of computational economy with the Jini leasing mechanism.

6. References

1. JiPANG [http://ninf.is.titech.ac.jp/jipang/]
2. Jini [http://www.jini.org/]
4. Indiana IU Active Notebook [http://www.extreme.indiana.edu/an/index.html]
5. Ninf [http://ninf.etl.go.jp/]
8. JLAPACK [http://icl.cs.utk.edu/f2j/]
9. Bricks [http://ninf.is.titech.ac.jp/bricks/]
10. NWS [http://nws.npaci.edu/NWS/]